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**EMOTIONAL INTELLIGENCE-CENTERED TEACHING AND  
LEARNING FOR IMPROVING STUDENTS' ACADEMIC  
PERFORMANCE AND EVALUATING THROUGH DATA MINING**

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**Abstract:**

*Emotions are a normal and unavoidable element of every aspect of a person's existence. In each and every instant, a person's emotions either strengthen or shed themselves in response to the various conditions. Emotions have the potential to obstruct a learner's ability to learn by restricting their capacity to maintain emotional equilibrium, causing anxiety in particular about specific class work, and activating emotional reactions to events that occur in the classroom. Emotional intelligence is the key that opens the door to significant learning possibilities and guides pupils to find them for themselves. Learners who are able to "recognise, appraise, regulate, and communicate their emotions" are considered to have high levels of emotional intelligence. The student receives assistance and the capacity to successfully regulate their negative emotions via the use of a strategy that is emotionally oriented. The most important objective of the work that has been presented is to make it possible to learn using the Emotionally Based Approach (EBA) in a variety of learning environments. In addition to this, it uses various well-known Machine Learning Classification Algorithms in order to conduct an analysis and comparison of the results. The intention of the work that has been presented is to provide an introduction to emotional intelligence along with a literature review, and then proceed to describe how an emotional intelligence-based approach may be used in three distinct types of learning environments. The many supervised learning algorithms, including Decision Tree algorithms, the Bayesian Approach, and Neural Networks, are put into practise, and the results are compared, with the goal of developing a superior solution that would assist educational institutions in improving their results. The findings of the experiment also shown that learning is facilitated when participants are feeling happy and optimistic.*

**Keywords:** Behaviour Analysis; Data Mining; Emotional Intelligence; Machine Learning; Learners Performance.

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**Introduction:**

The capacity to "recognise, analyse, regulate, and communicate their emotions" is referred to as "emotional intelligence" (EI), and it is a component of emotional intelligence (EI). Alterations and enhancements need to be made to the educational system. An enthusiastic emphasis is cast on learning itself as a result of the intellect that went into successfully pushing the limits of educational improvement. Researchers are motivated to do research on emotional intelligence because students in any educational setting engage in social interaction within their groups, where they often face a variety of emotional issues. Emotional intelligence (EI) is a trait that can be cultivated and tested, as stated in [12]. EI is related to productivity and performance that can be developed. [18] Emotional Intelligence refers to a change in human behaviour that is both lasting and develops over time. It is possible for learners to improve their academic performance by controlling the emotions that they feel. It is of the utmost importance to be able to keep one's emotions in check, and it is important to take note of intense feelings. The formation of one's own attitudes comes first, followed by the realisation that such

attitudes are ultimately responsible for our identities [6]. This activates the three prongs of the pragmatic triangle: ideas, feelings, and deeds. Additionally, academic achievement is dependent on a wide variety of factors, including a student's cognitive ability, emotional intelligence, the curriculum, the student's socioeconomic situation, the learning environment, the student's housing environment, and the instructional materials. Many different types of research have all come to the same conclusion: the Emotional Intelligence of pupils is a crucial factor in determining how well they do in school. There has been a growing awareness in the modern era of the association between cognition and emotion in educational and psychological contexts, with an emphasis on how the interrelation between cognitive and emotional indulgence has an effect on public and academic amendment [4]. This has led to an increase in the amount of research that has been conducted in this area. Emotional components are an essential component of the process of education and learning. Emotional intelligence, or EI, is described as the ability to precisely perceive, evaluate, and communicate emotions, as well as the capacity to comprehend emotions and emotional knowledge. monitor, notice, identify, reason about, and comprehend

emotions, as well as to utilise emotions to direct activities, solve problems, increase thinking, and encourage progress; as well as the power to control emotions to advocate emotional and intellectual growth [11]. [Citation needed] Recent definitions of emotion have either placed more emphasis on the external stimuli that cause emotion or on the internal reactions that are involved in the emotional state [9]. [Note: The learner may experience a broad range of emotions depending on the situations that they are confronted with both within and outside of the learning environment [15]. Numerous studies conducted from an educational point of view have come to the conclusion that inadequate levels of EI have a detrimental effect on the academic performance of students [1], However, the predominant educational approach does not place a strong emphasis on students' academics. As an alternative, some research suggests that students with a higher intelligence are more likely to achieve success than students with a lower intelligence; however, this assertion is not supported by the evidence. Learners' feelings may get in the way of their education in a number of different ways, including reducing their ability to maintain emotional equilibrium and increasing their likelihood of reacting emotionally to events that occur in the classroom [14]. Researchers at [13]

hypothesised that there would be a correlation between emotional intelligence and academic achievement in the sense that those who had a high level of emotional intelligence would also have a greater level of academic success. Because of the crucial connection that exists between emotional intelligence and educational action, [16] brings up the issue of the need of including emotional intelligence advising into educational activity training programmes. [2] conducted an analysis of the educational requirements that instructors need to fulfil in order to identify and implement new work models for teaching. Emotional intelligence, also known as EQ, is regarded to be the most important aspect in achieving one's life objectives, which serve as a source of inspiration, knowledge, and creativity. Therefore, EI is beneficial not only for enhancing the academic outcomes of students, but also for improving the students' life objectives [8]. Emotional intelligence (EI) is improved via the use of the Emotionally-Based Approach (EBA) in this body of research. This is done mostly in practical fields of study, which tend to overlook the importance of group ability. The faculty is now facing a highly crucial situation, which requires them to concentrate on the unique variations among the learners and to comprehend the learners. The act of

teaching requires knowledge, cognition, and expertise, all of which culminate in an emotional action on the part of the student. As a result, being able to comprehend and manage one's feelings in order to increase emotional intelligence (EI) is an essential component of a faculty's ability to function. In addition, the learning environment has been updated to make educational progression more effective. The new design places an emphasis on the lively relationships that exist between the student, the faculty, the content and services, and the technology.

#### **Materials and Methods:**

In the beginning stages of this study project, we used two different approaches to build the dataset. In the beginning, a questionnaire on the emotional behaviour of students while they are within the learning environment is framed. About fifty different surveys about the learning environment, the engagement of the learners, and the teaching techniques from the perspective of the learner were produced and are now being studied. The specific questionnaire was given out to all of the students, and the inquiry was carried out using the replies that were gathered from each individual student. Approximately one hundred twenty students took part in this investigation, and the key data for the dataset was collected

and structured from the outcomes of the research. The responses to the questionnaires that were filled out by the students provide valuable insight into the range of feelings that students experience when confronted with a variety of challenges within the classroom setting. Sample questionnaires are presented in table 1.

The second technique included the use of a camera to take a picture of each individual student's face. This image was then sent to the suggested system so that it could evaluate the feelings of each individual learner. The total number of people included in the study is 10,648, and 120 students are participating in the research. The dataset was constructed using the Emotionally Based Learning Environment, which will be explained further down, as well as the Multi Assessment Method (MAM), which included the use of a variety of learning strategies in order to derive the final outputs. The components that were researched, such as models of learning Emotional Based Learning (EBL) and Emotional Intelligence, may be divided into two categories: positive and negative. When analysing the outcome of a learner, various feelings experienced by the learner, such as happiness, interest, inspiration, self-control, enthusiasm, pleasure, gratitude, contentment,

imaginative hope, anger, irritated, scared, bored, detached, dependent, depression, irresponsible, anxiety, discouraged, and antagonistic, are acquired through exposure to one of three distinct learning environments. In addition, the Multi Assessment Method, often known as MAM, is used in order to assess the students' overall performance. MAM is comprised of feedback, written examination, assignments, presentations, projects, holistic demonstration, collaboration, Problem scenario, Discussion, Team Play, oral examination, and a creative empowerment approach [10]. Alterations in the learners' emotional states are also tracked, which enables learning to be tailored to each individual's needs.

The histogram of skin pixels and non-skin pixels from the currently active frame, as well as the skin area and non-skin area generated from the picture using the skin tone method. After determining how each student is feeling, a constructive method of instruction is used to teach them. This process is called emotional intelligence. The supportive learning environment creates learning chances that aid in the process of discovery as well as the growth of one's knowledge and skillfulness. It is essential that the learning environment provide its participants with the greatest possible chance to be dynamic

learners, to be inspired to learn more, to be challenged to take risks, to be emotionally supported, and to experience a general sense of respect. The provision of a good learning environment that enables the learners to feel comfortable, protected, and occupied is one of the many benefits associated with the recognition of emotions. Therefore, the students will be more receptive to actively participate in the many activities that take place inside the learning environment. The ability to concentrate on each individual student, the desire to be present at the learning environment, the opportunity to learn from and about the learner, as well as the ability to monitor the development of the learner are some of the factors that are used in a positive learning environment.

### **Emotional Based Learning Environment (EBLE):**

In today's world, the learning environment should be fluid and dynamic so that it can be adapted to the shifting demands that arise throughout the teaching and learning process. Learning opportunities that facilitate exploration as well as the development of one's knowledge and skillfulness should be produced by the environment. Both motivation and emotion are essential components of education because they work hand in hand to ensure that students

acquire new information and skills in a way that is meaningful to them. In the Emotionally Based Learning Environment (EBLE) that has been proposed, the learner's feelings and individuality are respected, comparisons between different learners are avoided, support is provided by recognising the learner's needs and talents, consideration on each other's feelings is afforded, the learners' interest and thirst to learn is stimulated and encouraged, and frequent changes are made in the practises and patterns that are used. The attributes of the learners, the reasons for teaching and learning, the activities that will best sustain learning, the assessment procedures that will best determine and compel learning, and the backdrop that instils the learning environment are the primary objectives of the learning environment. It is essential that the learning environment provide its participants with the greatest possible chance to be dynamic learners, to be inspired to learn more, to be challenged to take risks, to be emotionally supported, and to experience a general sense of respect.

The benefits of using an EBLE include the provision of a constructive learning environment that enables the learners to experience feelings of being comfortable, protected, and occupied. Therefore, the students will be more

receptive to actively participate in the many activities that take place inside the learning environment. Learners are given the chances to take responsibility for their own education, increasing the likelihood that they will get some benefit from the instruction they receive and also being more likely to be self-motivated.

### **Results and Discussion:**

The teaching and learning environment encouraged the use of technology and fostered a sense of empowerment among students and teachers, both of which are important factors in the process of motivating students. There has been a significant improvement across the board in terms of dedication shown in the classroom setting. It is possible to utilise a questionnaire to measure the unique emotional response that each learner has carried out during the activity. A questionnaire is employed as a positive sign pertaining to the learning environment and teaching approaches.

The Levene test is used to determine whether or not the variances of a variable that was determined for two or more groups are equal to one another. The descriptive output provides the sample size (N), mean, standard deviation, minimum, maximum, standard error, and confidence interval for each level of the independent variable supplied. One example of a

dependent variable is the cumulative grade point average (CGPA). The mean cumulative grade point average (CGPA) for students in the learning environment1 group is 14.93. The average grade point average for a "B" is 14.42. The CGPA "A" has a standard deviation of 4.821, whereas the CGPA "B" has a standard deviation of 5.302. There are varying numbers of people who take part in each CGPA (N). The means of the conditions are also extremely essential because they demonstrate the size of the disparity that exists between the circumstances and the group that has a higher mean, which can be observed. For instance, the mean for a CGPA of "A" is much higher than that of a CGPA of "C." The score for CGPA A (mean: 14.93, standard deviation: 4.821) was significantly higher than the score for CGPA C (mean: 12.32, standard deviation: 5.903).

To summarise what has been said above, the research was helpful in revealing the learners who were participating in emotional-based learning environments. The many instructional approaches that may be found in various learning environments are designed to help students learn more efficiently while

paying their maximum attention. Additionally, the learners' creative thinking improved, which acted as a significant support for the cognitive rehearsal and helped the knowledge learnt to be retained for an extended length of time. As a result of the changes made to the learning environment, the students are now able to have conversations within their respective groups, their questions and concerns are answered in an effective manner, the interaction between the instructor and the student is carried out in an efficient manner, and the students are motivated by positive thoughts. It has become clear that the students like the new learning environment and the new procedures that have been implemented. According to the findings of the Multi Assessment Method, the cumulative grade point average (CGPA) of the students goes up when they are feeling happy, whereas a low CGPA is caused by feeling sad or angry. According to the findings of the research that was carried out, more than ninety percent of students accounted for a considerable improvement in their inventiveness, motivation, and dedication in the classroom while they were studying in the new learning environment.



Figures and Tables:

Table 1. Sample Questionnaires used for the investigation

Questions	Not at all	A little bit	Moderately	Extremely
Do you try to understand faculty motivation for doing various activities in learning environment?	x			
When difficult thoughts are presented in your class, how confident you can understand them?		x		
Did you have confidence that you can complete all the work that is assigned in your class?				x
When you are under stress, how easily you stay in control?	x			
How often are you able to draw yourself out of a bad mood?				x
When things go wrong for you, are you able to remain calm?		x		
Did your faculty are respectful towards you?	x			
Did your faculty take time to make sure you understand the material?			x	
How interesting do you find the things you learn in class?		x		
How hard do you try to understand your faculty point of view?			x	

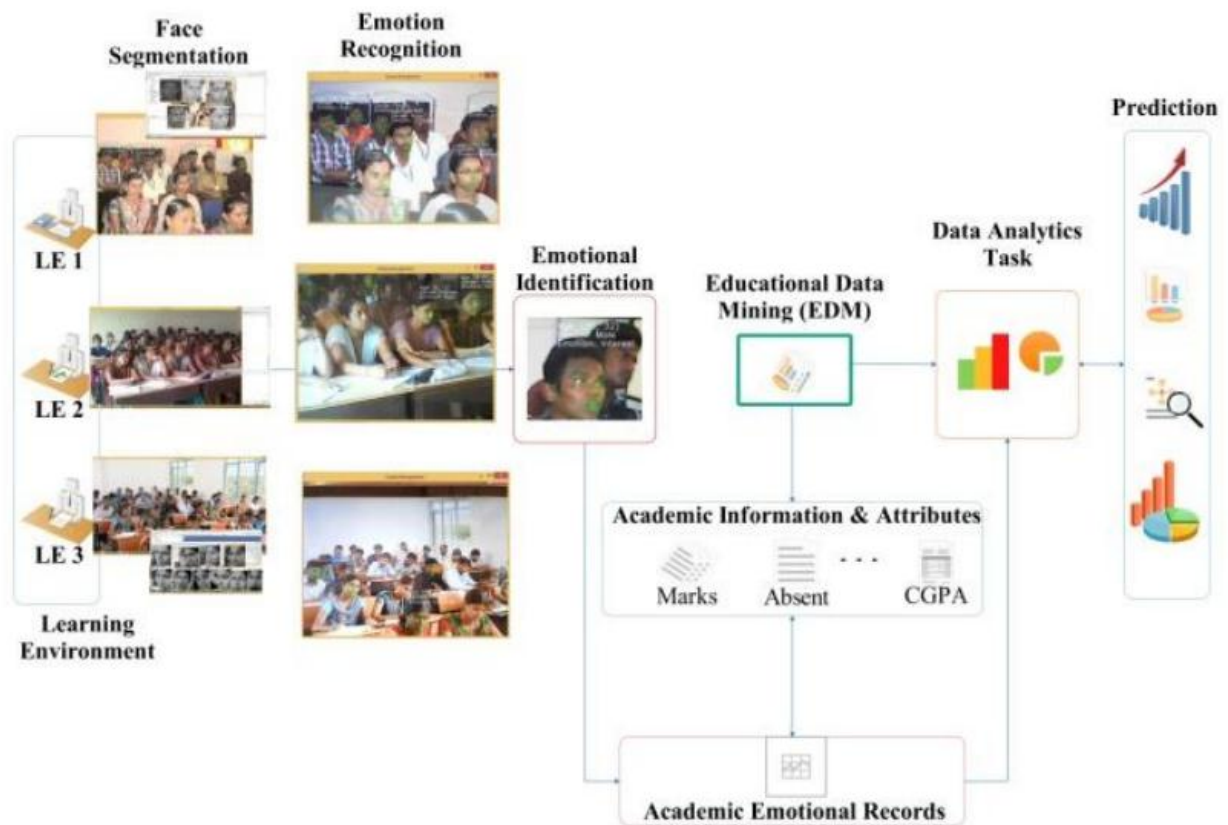
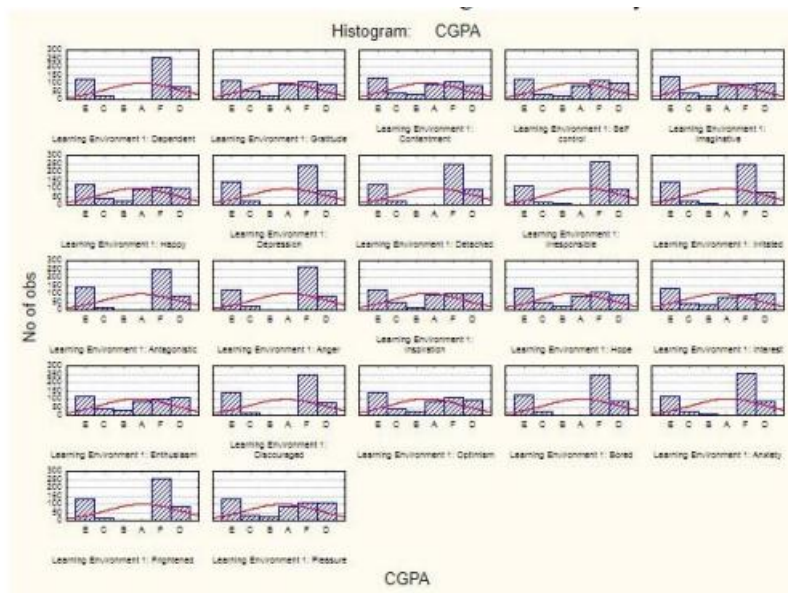


Fig. 1 Emotion recognition in the learning environment





*Fig.2 CGPA based on different emotions in Emotional Based Learning Environment*

### **Conclusion:**

In a nutshell, one's academic achievement is intimately connected to one's level of emotional intelligence. EBEL works by encouraging the learner to experience good emotions, which in turn increases the learner's capacity for learning, which in turn improves the academic result. The performance of the students, as measured by the Multi Assessment Method (MAM), provides the teachers with information that helps them determine how well the learning environment encourages constructive learning in the students. Also, the learning environment and teaching techniques are assessed with the use of a questionnaire survey, and the results show that learning in EBLE with various teaching methods enhances the learning capacity of the learner in a way that is oriented toward the

positive. In addition, the student's capacity to think critically improves, which makes it easier for the learner to get good results on the planned final test. Learners are able to engage in cognitive rehearsal because to the variety of teaching approaches, which in turn increases the amount of time available for practise and processing. Additionally, it enables students to cope with the challenges and important challenges that come with learning, which helps students maintain their motivation and achieve a high level of knowledge and performance.

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